

CLAIMS

1. A system for a chemically bonded ceramic material, comprising an aqueous hydration liquid and a powdered material, the binder phase of which powdered material essentially consisting of a calcium based cement system, which powdered material has the capacity following saturation with the liquid reacting with the binder phase to hydrate to a chemically bonded ceramic material, characterised in that said powdered material comprises a first part component for the formation of an organic phase in the ceramic material and that said hydration liquid comprises a second part component for the formation of said organic phase.
2. A powdered material, the binder phase of which essentially consisting of a cement system, which powdered material has the capacity following saturation with a hydration liquid reacting with the binder phase to hydrate to a chemically bonded ceramic material, characterised in that said powdered material comprises a first part component for the formation of an organic phase in the ceramic material.
3. A powdered material according to claim 2, characterised in that its binder phase is a calcium-containing ceramic powder in the group that consists of aluminates, silicates, phosphates, sulphates and combinations thereof.
4. A powdered material according to claim 2 or 3, characterised in that said first part component has the ability together with a second part component to form the organic phase that is a polymer, preferably a polymer in the group that consists of hydrophilic or partially hydrophilic acrylate, carbonate, protein, cellulose, siloxane or polyacetal based polymers.
5. A powdered material according to claim 4, characterised in that said first part component is a component in the group that consists of monomers for the formation of said polymer.
6. A powdered material according to any one of claims 2-5, characterised in that it exists in the form of granules of powder particles, which granules exhibit a degree of compaction above 55 % and a mean size of 30 – 250 μm .

7. A powdered material according to claim 6, characterised in that said granules exhibit a degree of compaction above 60 %, preferably above 65 % and even more preferred above 70 %.
- 5 8. The powdered material according to claim 6 or 7, characterised in that said granules exhibit a mean size of at least 50 μm , preferably at least 70 μm , but 200 μm at the most, preferably 150 μm at the most.
- 10 9. A powdered material according to any one of claims 6-8, characterised in that said granules exist in a composition that comprises up to 50 %, preferably 5-30 % and even more preferred 10-20 % non pre-compacted powdered material, preferably of the same cement-based system as the powdered material in the granules.
- 15 10. An aqueous hydration liquid for a powdered material, the binder phase of which essentially consisting of a cement system, which powdered material has the capacity following saturation with the hydration liquid reacting with the binder phase to hydrate to a chemically bonded ceramic material, characterised in that said hydration liquid comprises a second part component for the formation of an organic phase in the ceramic material.
- 20 11. A hydration liquid according to claim 10, characterised in that said organic phase is a polymer, preferably a polymer in the group that consists of hydrophilic or partially hydrophilic acrylate, carbonate, protein, cellulose, siloxane or polyacetal based polymers.
- 25 12. A hydration liquid according to claim 10 or 11, characterised in that said second part component is a component in the group that consists of monomers of preferably diacids or aminoacids.
- 30 13. A chemically bonded ceramic material, the binder phase of which essentially consisting of an inorganic cement phase, which ceramic material is in situ formed on a substrate or in a cavity, characterised in that said material also comprises an organic, in situ formed phase.
- 35 14. A ceramic material according to claim 13, characterised in that its binder phase is a calcium-containing ceramic powder in the group that consists of

aluminates, silicates, phosphates, sulphates and combinations thereof.

- 5 15. A ceramic material according to claim 13 or 14, characterised in that said organic phase is a polymer, preferably a polymer in the group that consists of hydrophilic or partially hydrophilic acrylate, carbonate, protein, cellulose, siloxane or polyacetal based polymers.
- 10 16. A ceramic material according to any one of claims 13-15, characterised in that the inorganic cement phase constitutes 50 % by volume or more of the material, while the organic phase constitutes less than 50 % by volume of the material, preferably 5-40 % by volume and even more preferred 10-35 % by volume and most preferred 15-25 % by volume.
- 15 17. A ceramic material according to any one of claims 13-16, characterised in that the organic phase exists as a phase that is non-communicating with the inorganic cement phase, preferably as separate areas.
- 20 18. A ceramic material according to any one of claims 13-17, characterised in that the organic phase exists as a network in the inorganic cement phase.
- 25 19. A ceramic material according to any one of claims 13-18, characterised in that the organic phase exists as a network or as separate areas in the inorganic cement phase, the parts of the network or the separate areas exhibiting a width of 5 μm at the most, preferably 1 μm at the most, and even more preferred 0.5 μm at the most.
- 30 20. A method of producing a ceramic material according to any one of claims 13-19, in which a powdered material, the binder phase of which essentially consisting of a cement system, is saturated with a hydration liquid that reacts with the binder phase, where after the material is allowed to hydrate into said chemically bonded ceramic material, characterised in that the organic phase is brought to be formed by in situ copolymerisation, preferably condensation polymerisation.
- 35 21. A method according to claim 20, characterised in that said powdered material is brought to comprise a first part component for the formation of the organic phase and that said hydration liquid is brought to comprise a second part component for the formation of the organic phase, the polymerisation reaction

being initiated when the powdered material is saturated with the hydration liquid.

- 5 22. A method according to claim 20, characterised in that the polymerisation reaction is photo- or thermochemically initiated.
- 10 23. A method according to any one of claims 20-22, characterised in the hydration and polymerisation reactions not being allowed to give a temperature exceeding 50 °C, preferably not exceeding 42 °C, in the material, which temperature control is preferably effected by the organic phase being brought to form a network or separate areas in the inorganic cement phase and/or by the organic phase being brought to constitute less than 50 % by volume of the material, preferably 5-40 % by volume and even more preferred 10-35 % by volume and most preferred 15-25 % by volume of the material.
- 15 24. A method according to any one of claims 20-23, characterised in that said powdered material initially is compacted to a degree of compaction above 55 %, where after it is finely divided into granules of powder particles, which granules exhibit a mean size of 30 - 250 µm.
- 20 25. Method according to claim 24, characterised in that said granules are mixed with up to 50 %, preferably 5-30 % and even more preferred 10-20 % non pre-compacted powdered material of the same cement-based system as the powdered material in the granules.
- 25 26. Method according to any one of claims 24-25, characterised in that the material is compacted to a raw compact that exhibits an average degree of compaction above 55 %, preferably above 60 %, even more preferred above 65 % and most preferred above 70 %.
- 30 27. Method according to any one of claims 24-25, characterised in that the material is suspended in a liquid that reacts with the binder phase, where after the resulting suspension/paste is drained and compacted before the material is allowed to harden by reaction between the binder phase and any liquid remaining, which compaction is preferably done to a degree of compaction above 55 %, preferably above 60 %, even more preferred above 65 % and most preferred above 70 %.
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- 5 28. Method according to any one of claims 24-25, characterised in that a liquid that reacts with the binder phase is distributed in said granules, where after a resulting paste is applied in a void that is to be filled with the ceramic material.
- 10 29. Method according to claim 28, characterised in that the liquid is supplied to said granules, which are thereafter pressed together by rolling, kneading or hand pressing, to a paste that is applied by packing or squirting in the void that is to be filled with the ceramic material.
- 15 30. A device (10, 20) for storing a powdered material and for mixing it with a hydration liquid, characterised in that said device comprises a first chamber (1) that holds a powdered material according to any one of claims 2-5, and a second chamber (2) that holds a hydration liquid according to any one of claims 6-8, and an openable seal (3, 6) between the chambers (1, 2).
- 20 31. A device according to claim 30, characterised in that there is a greater pressure in the second chamber (2) than in the first chamber (1).
32. A device according to claim 30 or 31, characterised in that at least the first chamber (1) has walls (4) of a wall material that allows for processing of the powdered material through the walls (4).